Original Article

Post BCG Vaccination Lymphadenitis with or Without Supporation, What is the Optimum Management

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ABSTRACT

Background:The Bacille-Calmette-Guerin (BCG), a living attenuated vaccine with characteristic residual virulence, has been used to prevent tuberculosis since 1921. The world health organization (WHO) has recommended BCG Vaccination as a part of the global expanded program for immunization (EPI) in developing countries. Lymphadenitis with or without suppuration is the most common complication of this vaccination.

Study Design: Retrospective Study

Place and Duration of Study: This study was conducted in Nishtar Hospital, Multan Pakistan and King Faisal Hospital Taif, KSA between May 2009 to June 2012.

Materials and Methods: All patients referred to pediatric surgical service in a period of three years were retrospectively studied for optimum management.

Results: Our all 28 patients underwent surgical management and were advised antituberculous treatment but only 6 (21.4%) were compliant with medical treatment. All patients recovered after surgery with or without antituberculous treatment.

Conclusion: Optimum treatment for post BCG lymphadenitis who are unresponsive to medical treatment is surgery. Post operative antituberculous treatment seems to be unnecessary.

Key Words: Bacillus Calmette-Guerin (BCG); Lymphadenitis; Management.

INTRODUCTION

The live attenuated Bacillus Calmette-Guerin (BCG) vaccine is the oldest vaccine that continues to be widely used nowadays. It is derived by in vitro attenuation of an isolate of Mycobacterium bovis especially cultured in an artificial medium for years and named after its discoverers, the French bacteriologist Albert Calmette and veterinarian Camille Guerin[1]. The product was subsequently distributed to many laboratories, which continue to propagate the vaccine strain under different conditions. The marketed strains of BCG from different pharmaceutical companies are now bacteriologically different[1]. The BCG, a living attenuated vaccine with characteristic residual virulence, has been used to prevent tuberculosis since 1921. The world health organization (WHO) has recommended BCG Vaccination as a part of the global expanded program for immunization (EPI) in developing countries[2]. Though, the efficacy of BCG vaccine against tuberculosis is uncertain, it is generally agreed that the vaccine is protective against the meningeal/miliary TB in childhood tuberculosis[3]. BCG is a live attenuated vaccine and is being given routinely to all newborns under the universal immunization program. BCG vaccine induces delayed type of hypersensitivity (DTH) reaction and cell-mediated immunity in the host 4-8 weeks after vaccination[4]. After intradermal injection, BCG start multiplying rapidly at the site of inoculation and later is transported through the lymphatics to the regional lymph glands, followed by heamatogenous dissemination resulting in creation of very small foci in different organs. This is also called normal in the course of successful BCG vaccination[5].

Although BCG vaccination often results in local adverse reactions, serious complications are rare, therefore BCG vaccine is considered as safe method of tuberculosis prevention. lymphadenitis is the most common complication of BCG vaccination[6]. There are two forms of BCG lymphadenitis in natural course of lymphadenopathy. Simple or non-suppurative lymphadenitis which may resolve spontaneously within a few weeks, and suppurative lymphadenitis, which characterized by appearance of fluctuation with erythema and edema of the overlying skin[5].

The incidence of regional suppurative lymphadenitis ranges from 0.1-38/1000[7]. There appears to be no agreement on the treatment of this relatively common complication. Opinions differ widely, from no treatment to surgical drainage to administration of antituberculous drugs. The beneficial effects of these therapies are controversial[8]. The aim of this study was to find out an optimum management for unresolved supporative or non supporative post BCG lymphadenitis.

MATERIALS AND METHODS

This retrospective study was carried out in Nishtar Hospital, Multan Pakistan and King Faisal Hospital Taif, KSA between May 2009 to June 2012. Medical records were reviewed on sex, place of vaccinations, interval between vaccinations and development of lymphadenitis, clinical findings on physical examinations, hematological, microbiological and histopathological data, chest radiographs, treatment and outcome. 28 patients were referred to pediatric surgery departments for surgical treatment after failure of medical treatment.

Indications of surgery include failure of medical treatment, large (~2.0cm) lymph nodes, and development of fluctuation and inflammation of overlying skin. The surgical procedure was performed under general anaesthesia where indicated, including repeated aspiration of supporative lymphadenitis, excision of lymph node or excision of abscess along with necrotic lymph node. Debridement of all the necrotic tissue and excision of enlarged lymph nodes was performed through a skin crease incision. After hemostasis the wound was closed in subcuticular fashion using 5/0 Vicryl suture after leaving a Penrose drain. A pressure dressing was applied for 48- hours. All the surgical specimens were sent to microbiology; for a routine and AFB culture on Lowenstein Jensen agar and for histopathological evaluation.

RESULTS

Total 28 patients underwent surgical intervention in a period of 3 years. Males suffered a little higher than the females. Male / female ratio was 1.33:1 (Table-1).

Age distribution at the time of referral for surgical opinion ranged between 4 and 24 weeks. The highest rate of lymphadenopathy was found between 6-12 (64.2%) weeks of life. None of our patient was more than 24 weeks at the time of referral to our department (Table-2).

Maximum patients were having lymphadenopathy in ipsilateral axilla, 24 (85.7%), followed by supraclavicular region and both (Table-3).

3 (10.7%) of our patients who had frank suppuration without palpable lymph node underwent repeated aspirations and ultimately healed after 3-5 sessions at weekly interval and in remaining primary excision of lymph node , abscess or sinus was done (Table-4). AFB was positive in 6 patients. Histopathological evaluation of extirpated nodes showed caseous necrosis and granuloma formation, a finding consistent with tuberculosis.

Table No.1: Sex Distribution (n = 28)

Sex	No. of patients	Percentage
Male	16	57.1
Female	12	42.9

All patients were prescribed INH for 3 months. Only 6 (21.4%) patients were compliant with complete treatment. Remaining 22(79.6%), either took incomplete therapy or not at all. 2 of 28 (7.1%) patients developed wound infection and recovered with simple dressing for a few days. Patients were followed for 6 months. All recovered fully without any lymphadeno-pathy, sinus or systemic disease with or without antituberculous treatment.

Table No.2: Age distribution (n = 28)

Age (years)	No. of patients	%age
< 6	02	07.1
6-12	18	64.2
13-16	06	21.4
17-24	02	07.1

Table No.3: Distribution of region of lymphadeno-pathy (n = 28)

Region	No. of patients	%age
Axilla	24	85.7
Supraclivicular	03	10.7
Both	01	03.6

Table No.4: Surgical management

Method of surgery	No. of patients	%age
Excision of lymph node	12	42.8
Excision of abscess	11	39.3
Repeated aspirations	03	10.7
Excision of sinus	02	07.1

DISCUSSION

Approximately 100 million children receive BCG vaccine every year. The most common local reaction at the site of injection is in a form of skin induration 5–15 mm wide, and a crust formation occurs from 3 to 4 weeks. When the crust falls off between the 6th and 10th week, a flat scar measuring 3-7 mm remains[9]. The most common complication of BCG vaccination is lymphadenopathy or suppurative lymphadenitis, which occurs in the axilla as seen in our patients and rarely in the neck region. The incidence of BCG adverse reaction differs between regions, ranging between 1-10% to 0.1-0.5 per 1000 vaccinations[10]. Disseminated infection is a serious complication which occurs at a rate of less than 1 in a million vaccinations[6], and nearly all reported cases were seen in immuno-compromised patients[11]. BCG lymphadenitis is commonly observed two to eight weeks following vaccination, although there can be a delay up to 6 months or even more[12]. Most of our patients presented between 6 and 12 weeks of life. Nazir et al mentioned some cases beyond 6 months also[13].

The risk factors associated with BCG lymphadenitis can be either host-related or vaccine-related[1]. Host-related factors:

1. Age. Vaccine given during the neonatal period is associated with a higher risk of regional lymphadenitis.

2. Immunocompetence. Immunocompromised patients such as those suffering from severe combined immunodeficiency or AIDS have increased complication rates of local as well as disseminated BCG infections.
3. Route of administration. Failure of intradermal injection may result in inadvertent subcutaneous administration, which contributes to increased complication rate[14].
4. Race. A wide variation in the incidence of BCG-related complications has been reported in different countries and ethnic groups.

(B) Vaccine-related factors:
1. Dosage of BCG vaccine. Over dosage may lead to more severe adverse reactions.
2. Residual virulence of the BCG strain. BCG strains from different pharmaceutical manufacturers are known to have different reactogenicity[15].
3. Viability of final vaccine product (the relative proportions of living and dead bacilli).
This is related to the quality of the administered vaccine and is affected by storage conditions such as the cold chain.

Lymphadenopathy occurred on the side of vaccination in all of our patients and axilla was the most commonly involved region (85.7%). In one study the localization of lymphadenopathy was also common in left axillary area (n=57), followed by left supraclavicular region (n=2) and right inguinal region (n=1)[13].
There are variable recommendations for management of post BCG lymphadenopathy and suppurative lymphadenitis. This management ranges from no treatment to treatments such as needle aspiration, drug treatment, surgical drainage, surgical excision, or a combination of two[16]. Several antibiotics (e.g. erythromycin) and antituberculous medications (e.g. isoniazid and rifampicin) have been used. There are case series suggesting their efficacy[17]. Well controlled trials involving more subjects have shown that these drugs cannot prevent suppuration nor shorten the duration of healing[18].
Some authors advocate a single intranodal injection of isoniazid after needle aspiration. Local isoniazid therapy caused significantly earlier resolution of the abscesses (3.9 months) compared with Erythromycin therapy alone (5.2 months; $P < 0.001$)[19]. For adherent or fistulated lymph nodes, the World Health Organization (WHO) suggests drainage and direct instillation of an anti-TB drug into the lesion. Patients with non suppurative and non adherent lymphadenitis were managed in other centers with regular follow up till the lymphadenitis regresses spontaneously over a period of few week[20]. In a series from Japan, lymphadenopathy was detected in 253 (0.79%) of 34 516 vaccinated children. The great majority resolved spontaneously and only eight (0.02%) proceeded to suppuration and discharge[21].
Needle aspiration has a major role in the management of post-BCG fluctuant (suppurative) lymphadenitis. The advantage of needle aspiration is prevention of spontaneous perforation and sinus formation[22]. If properly done, it has no significant complication or morbidity[1]. We did needle aspiration on 3 cases, all healed without any complications. The effect of needle aspiration was retrospectively studied on 24 cases. Successful results were achieved with complete resolution in 22 (92%) patients in a period of 3-6 months of follow up. Those patients treated by weekly needle aspirations approximately 3 -5 times and covered with Erythromycin 30-50 mg/kg for 4-6 weeks[9]. Aglayan et al also obtained satisfactory results in non drained suppurative adenitis with needle aspiration[23].
Surgical excision is a definitive way to remove the affected lymph node(s) and promote early cure and better wound recovery. However, the patient needs to bear the risks of general anaesthesia in addition to the risks of surgical manipulation, which are considerably higher in infants as compared to older individuals[16]. Surgical excision should be considered as the last resort in case of failed needle aspiration (dry tap or recollection despite repeated aspirations), and in those patients with matted and multi-loculated lymph nodes[1]. Wound healing after excision is usually excellent. A Penrose drain in the residual space after the excision of axillary lymph nodes can prevent seroma. Although recommended, postoperative anti-tuberculosis therapy seems to be unnecessary[1,13]
Simple incision and drainage is not recommended because it results in persistent discharges requiring cumbersome dressing, inadequate evacuation of inflammatory materials, suboptimal wound healing, scarring and delayed recovery[16,24]. We did excision of lymph node in 12 (42.8%), excision of abscess in 11 (39.3%), and excision of sinus in 2 (7.1%) cases. Nazir et al mentioned their experience on 52 cases who underwent surgical excision. All patients recovered fully with minor complications with or without antituberculous drugs[13]. Our 6 (21.4%) patients were compliant with antituberculous treatment but all recovered irrespective of antituberculous treatment and none of them suffered with recurrent sinus, lymphadenopathy or systemic disease.

CONCLUSION

Management of BCG lymphadenitis is primarily surgical. Supporative lymphadenitis may heal completely with needle aspiration but in case of suppuration with palpable lymph node or sinus or lymph node > 2 cm in size, excision with primary closure of wound with a penrose drain for 48 hours or so should be carried out. Antituberculous drugs seem to be unnecessary although recommended by many authors.

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